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IS 8611 (1988): Technical supply conditions for milling arbors and accessories [PGD 32: Cutting tools]

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Indian Standard

TECHNICAL SUPPLY CONDITIONS FOR MILLING ARBORS AND ACCESSORIES

(First Revision)

Small Tools Sectional Committee EDC 45; Accessories for Tool Holding Subcommittee, EDC 45 : 8 [Ref : Doc: EDC 45 (4281)]

1. Scope — Covers the nomenclature, material and other requirements for milling arbors and their accessories.

2. Nomenclature

2.1 The nomenclature is explained in Fig. 1, 2 and 3 and illustrate, milling arbor with different accessories in position.

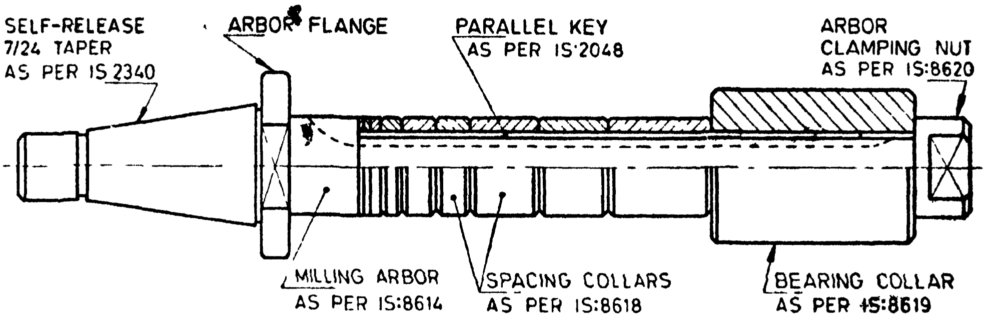

FIG. 1 MILLING ARBOR WITH ACCESSORIES IN POSITION

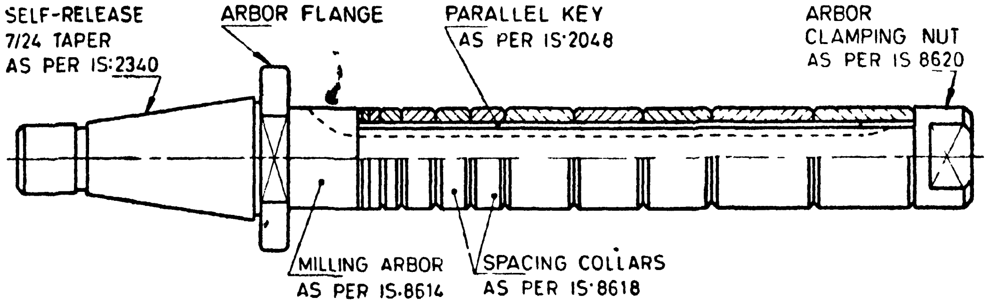

FIG. 2 MILLING ARBOR HAVING PILOT WITH ACCESSORIES IN POSITION

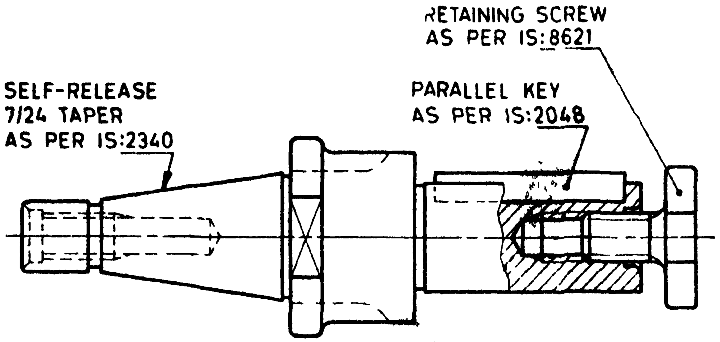

FIG. 3 STUB MILLING ARBOR WITH KEY AND RETAINING SCREW

Adopted 16 April 1988	© June 1989, BIS	Gr 4

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

3. Material

3.1 *Arbor and Clamping Nuts* — Case-hardening steel having minimum tensile strength of 800 MPa in the case after heat treatment.

3.2 *Accessories*

3.2.1 *Spacing collar* — Steel with minimum tensile strength of 600 MPa.

3.2.2 *Bearing collar* — Case-hardening steel with minimum tensile strength of 600 MPa in the core after heat treatment.

3.2.3 *Retaining screw* — Shall be of property clause **10.9** of fasteners screw as per IS : 1367 (Part 3)-1979 'Technical supply conditions for threaded fasteners : Part 3 Mechanical properties and test methods for bolts, screws and studs with full loadability (*second revision*)'.

4. Hardness

4.1 *Arbor* — 630 *HV*, *Min*; and
720 *HV Max*.

4.1.1 Threads provided in the arbor for draw bolts, clamping nut and retaining screw shall be left soft.

4.2 *Spacing collar* — 580 *HV, Min;* and
630 *HV, Max*.

4.3 *Bearing collar* — 690 *HV*, *Min*; and
770 *HV, Max*.

4.4 *Clamping nut* — 580 *HV, Min*; and
630 *HV, Max*.

5. Dimensions and Tolerances

5.1 Arbors shall be manufactured in accordance with dimensions and tolerances specified in the relevant standard. The figures for different types of arbors are intended to illustrate the dimensions, and the design details are left to the discretion of the manufacturer, so long as the dimensions affecting interchangeability are maintained.

5.2 *Dimensions for Keys and Keyways in Arbor Spacing Collar and Bearing Collar* — Shall be according to IS : 6285-1971 'Dimensions for interchangeability of milling cutters and milling arbors with key drive'.

5.3 Dimensions for tenons shall be according to IS :6310-1971 'Dimensions for interchangeability of milling arbors and milling cutters with tenon drive'.

5.4 Taper shanks for arbors shall be according to IS : 2340-1972 'Dimensions for self-release (7/24) tapers for milling arbors and tool shanks (*first revision*)'.

5.5 Unless otherwise specified, the arbors, clamping nuts and retaining screws shall be provided with right-hand threads.

5.6 The tolerance for dimensions without specified tolerances shall be of medium grade according to IS : 2102 (Part 1)-1980 'General tolerances for dimensions and form and position : Part 1 General tolerances for linear and angular dimensions (*second revision*)'.

5.7 Parallel keys provided with arbor shall be according to IS : 2048-1983 'Specification for parallel keys and keyways (*second revision*)'.

6. Designation

6.1 The designation of an arbor shall indicate:

a) Commonly used name,
b) Size of taper,
c) Arbor diameter, and
d) Arbor useful length or arbor total length (for stub arbors).

6.1.1 Example of designation for different types of arbors are given in relevant standard.

AMENDMENT NO. 2 MARCH 1997
TO
IS 8611 : 1988 TECHNICAL SUPPLY CONDITIONS FOR MILLING ARBORS AND ACCESSORIES

(First Revision)

(*Page* 2, *clause* 3.1) — Substitute the following for the existing clause:

'3.1 ***Arbor and Clamping Nuts*** – Case-hardening steel having tensile strength 800 MPa minimum and the case depth shall be 0.5 to 1.0 mm after heat treatment.'

(PE 11)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 1 JANUARY 1992

TO

IS 8611 : 1988 TECHNICAL SUPPLY CONDITIONS FOR MILLING ARBORS AND ACCESSORIES

(First Revision)

(*Page* 1, *Fig.* 2) — Substitute the following figure for the existing figure:

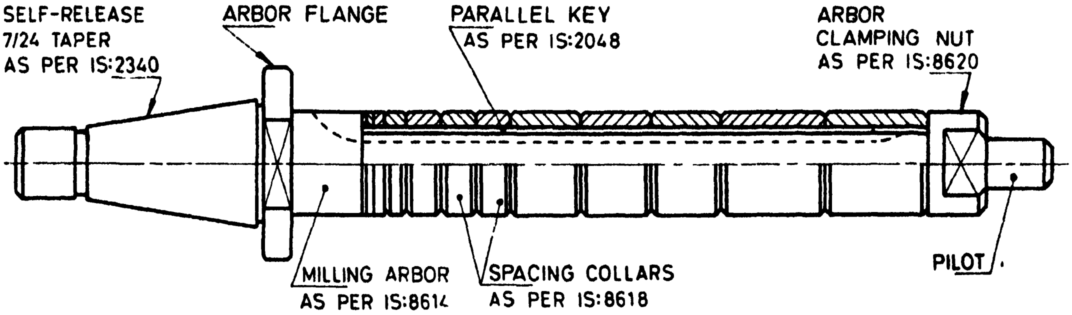


FIG. 2 MILLING ARBOR HAVING PILOT WITH ACCESSORIES IN POSITION

(*Page* 3, *clause* 7, *line* 1) — Insert the words 'and accessories' after 'Arbors'.

(*Page* 3, *table*) — Insert '*d*' in col title 'Arbor Dia'.

(*Page* 4, *table*) — Insert '*l*' in col title 'For Useful Arbor Length'.

(*Page* 4, *table*)

i) Substitute 'For Useful Arbor Length' *for* 'For Arbor Useful Length'
ii) Substitute 'µm' *for* 'mm' in the title of second column.

(*Page* 4, *clause* 11.1, *Example*) — Substitute 'useful arbor length' *for* 'arbor length'.

(*Tables* 1, 2 *and* 3, *first column*) — Substitute 'Useful Arbor Length' *for* 'Arbor Length'.

PE (11)

Printed at Printrade, New Delhi, India

6.2 The designation of an accessory for milling arbor shall indicate:

- a) Commonly used name,
- b) Bore diameter, and
- c) Thickness.

6.2.1 Example of designation for different accessories are given in relevant standards.

7. Workmanship and Finish — Arbors shall be supplied well finished with ground surfaces wherever indicated, and shall be free from burrs, seams, cracks and other manufacturing defects.

8. Accessories for Milling Arbors — The accessories for milling arbors to be supplied with each arbor shall be in accordance with the dimensions and tolerances specified in relevant standard.

9. Guide of Ordering a Complete Set — As given in Tables 1 to 3 of Appendix A.

10. Tests

10.1 Each arbor and accessory shall be inspected for its dimensional and geometrical accuracies.

10.1.1 The permissible variation in true running of face with respect to the axis shall be measured at the point as shown in Fig. 4 and 5, and shall not exceed value given below.

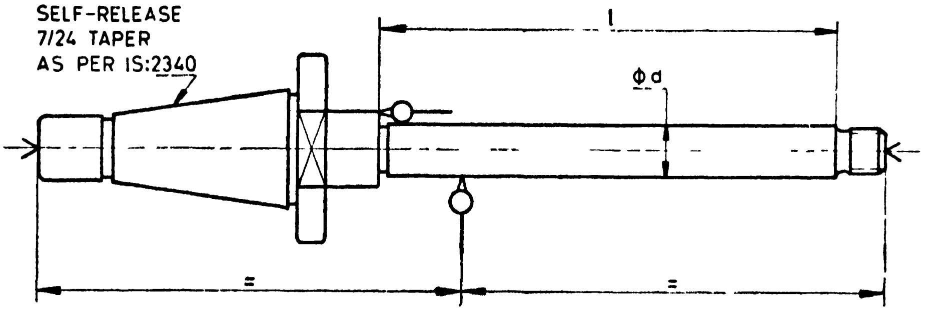


FIG. 4 TESTING CONCENTRICITY AND TRUE RUNNING OF FACE OF AN ARBOR

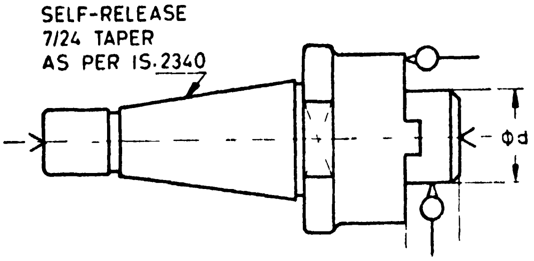


FIG. 5 TESTING CONCENTRICITY AND TRUE RUNNING OF FACE OF STUB ARBOR

Arbor Dia (mm)	**Permissible Variation in True Running of Face** (μm)
10	5
13	6
16	6
22	6
27	7
32	7
40	7
50	8
60	8
80	10
100	10

10.1.2 The error in concentricity of arbor diameter with respect to 7/24 taper is a function of useful arbor length and shall be measured in the middle of overall length as shown in Fig. 4 and shall not exceed the limits given below:

For Arbor Useful Length	Permissible Error in Concentricity in mm
200	15
250	15
315	15
400	20
500	25
630	30
800	35
1 000	40

10.1.3 The permissible error in concentricity of the stub arbor and of the taper shall be measured at any point on the taper, and shall not exceed 0·01 mm at each point and also with respect to each other.

11. Marking

11.1 Arbors shall be legibly and indelibly marked with the nominal size and manufacturer's name, initials or trade-mark. The marking shall be applied in such a manner that it does not affect the proper functioning.

Example

An arbor with self-release (7/24) taper 40 having arbor diameter $d = 22$ mm and arbor length $l = 250$ mm shall be marked as:

40 × 22 × 250

(Manufacturer's name)

11.2 Accessories for milling arbors shall be legibly and indelibly marked with the nominal size and manufacturer's name, initials or trade-mark. The marking shall be applied in such a manner that it does not affect the proper functioning.

Example

A spacing collar having diameter $d = 16$ mm and width $l_1 = 20$ mm shall be marked as:

16 × 20

(Manufacturer's name)

12. Protective Coating and Packing

12.1 Milling arbor or accessory for milling arbor shall be covered with suitable rust-proof material and wrapped in non-absorbent paper separately.

12.2 Milling arbor or accessory for milling arbor treated as given in **12.1** shall be packed in suitable boxes for safe handling and transport.

12.3 Only one arbor shall be packed in one box and the box shall bear the type of arbor, nominal size, manufacturer's name, initials or trade-mark, and the country of manufacture.

12.4 Accessories may be packed individually or as a set and the carton shall bear the name, nominal size; and manufacturer's name, initials or trade-mark, and the country of manufacture.

APPENDIX A

(*Clause* 9)

GUIDE FOR ORDERING A COMPLETE SET OF ARBOR WITH ACCESSORIES

A-1. Arbors are generally ordered complete with bearing collar, spacing collar and clamping nuts. In order to make the best use of minimum number of those items, a guide for ordering a complete set is given. The number and the size of spacing collars in different sets shall be as given in Tables 1 to 3. The arbors may be ordered in three different types of complete sets depending on the number of each item in that particular set as given below:

Complete Set B : Arbor with clamping nut, set of spacing collars and parallel key;

Complete Set C : Arbor with clamping nut, one bearing collar, set of spacing collars and parallel key; and

Complete Set D : Arbor with clamping nut, two bearing collars, set of spacing collars and parallel key.

A-2. Method of designating complete set is given below:

a) *Designation of Complete Set B* — A complete set B for an arbor with self-release (7/24) taper 30, arbor diameter $d = 22$ mm and arbor useful length 250 mm shall be designated as:

Arbor 7/24 Taper 30 × 22 × 250
Complete Set B

b) *Designation of Complete Sets C and D* — In addition to the arbor, it shall include the size of bearing collar required.

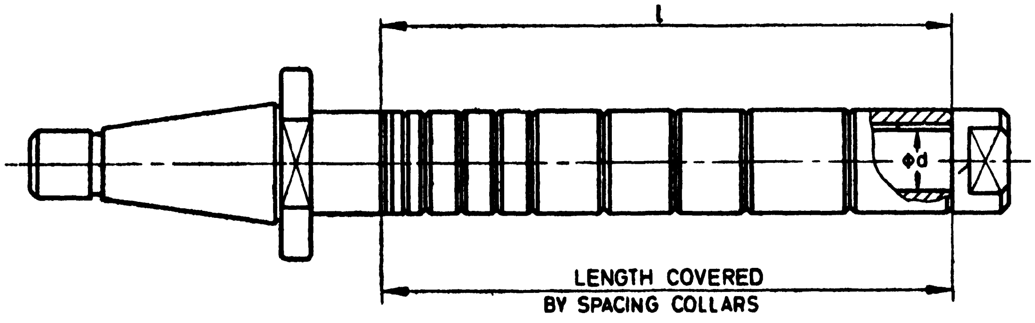
Examples

Arbor 7/24 Taper 30 × 22 × 250
Complete set D with bearing collar 22 × 48 ×70

TABLE 1 SET OF SPACING COLLAR TO SUIT COMPLETE SET B

(*Clauses* 9 *and* A-1)

All dimensions in millimetres.

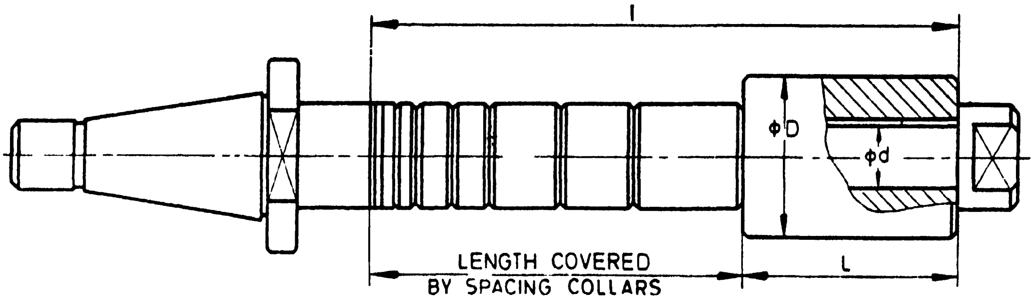


Arbor Length, *l*	Number of Spacing Collars of Thickness									For Arbor Diameter *d*
	1	2	3	6	10	20	30	60	100	
200	1	1	1	1	4	3	3	—	—	16, 22, 27
250	1	1	1	1	4	4	4	—	—	16, 22, 27, 32
315	1	2	2	1	4	4	6	—	—	16, 22, 27, 32, 40
400	1	3	1	2	4	5	8	—	—	16, 22, 27, 32, 40, 50, 60
500	1	3	1	2	3	3	3	5	—	22, 27, 32, 40, 50, 60
630	2	1	2	2	4	3	5	6	—	22, 27, 32, 40, 50, 60
800	2	3	2	3	3	2	4	3	4	27, 32, 40, 50, 60, 80, 100
1 000	3	3	3	4	4	3	4	4	5	32, 40, 50, 60, 80, 100

TABLE 2 SET OF SPACING COLLARS TO SUIT COMPLETE SET C

(*Clauses* 9 *and* A-1)

All dimensions in millimetres.



Arbor Length	**Bearing Collar**		**Length Covered by Spacing Collar**	**Number of Spacing Collars of Thickness**									**For Arbor Diameter** ***d***
l	*D*	*L*		1	2	3	6	10	20	30	60	100	
200	42	60	140	1	1	1	1	3	2	2	—	—	16
	48	70	130	1	1	1	1	3	3	1	—	—	16, 22, 27
250	48	70	180	1	1	1	1	2	3	3	—	—	16, 22, 27
	56	80	170	1	1	1	1	4	3	2	—	—	16, 22, 27, 32, 40
315	48	70	245	1	2	2	1	3	4	4	—	—	16, 22, 27
	56	80	235	1	2	2	1	4	3	4	—	—	16, 22, 27, 32, 40
	70	100	215	1	2	2	1	4	2	4	—	—	22, 27, 32, 40
400	48	70	330	1	3	3	1	3	5	6	—	—	16, 22, 27
	56	80	320	1	1	1	1	5	4	6	—	—	16, 22, 27, 32, 40
	70	100	300	1	1	1	1	5	3	6	—	—	22, 27, 32, 40, 50
	85	120	280	1	1	1	1	3	3	6	—	—	27, 32, 40, 50
500	48	70	430	2	3	4	2	3	5	9	—	—	22, 27
	56	80	420	1	3	3	1	3	5	9	—	—	22, 27, 32, 40
	70	100	400	1	3	1	2	4	5	8	—	—	22, 27, 32, 40, 50
	85	120	380	1	3	1	2	4	4	8	—	—	22, 27, 32, 40, 50
630	56	80	550	1	3	1	2	3	4	4	5	—	22, 27, 32, 40
	70	100	530	1	3	1	2	3	3	4	5	—	22, 27, 32, 40, 50
	85	120	510	1	3	1	2	3	2	4	5	—	22, 27, 32, 40, 50
	110	140	490	1	3	1	2	3	1	4	5	—	50, 60
800	56	80	720	2	1	2	2	4	3	6	7	—	27, 32, 40
	70	100	700	2	1	2	2	4	5	6	6	-	27, 32, 40, 50
	85	120	680	2	1	2	2	4	4	6	6	—	27, 32, 40, 50
	110	140	660	2	1	2	2	4	3	6	6	—	50, 60, 80, 100
	140	160	640	2	1	2	2	2	3	6	6	—	50, 60, 80, 100

(*Continued*)

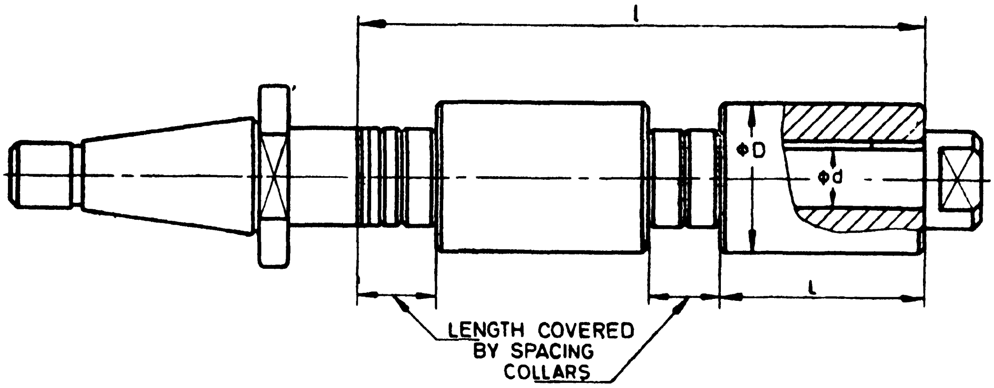
TABLE 2 SET OF SPACING COLLARS TO SUIT COMPLETE SET C — *Contd*

Arbor Length	Bearing Collar		Length Covered by Spacing Collar	Number of Spacing Collars of Thickness									For Arbor Diameter *d*
l	*D*	*L*		1	2	3	6	10	20	30	60	100	
1 000	56	80	920	3	3	3	4	4	2	4	3	5	32, 40
	70	100	900	3	3	3	4	4	1	4	3	5	32, 40, 50
	85	120	880	3	3	3	4	2	1	4	3	5	32, 40, 50
	110	140	860	3	3	3	4	3	1	3	3	5	50, 60, 80
	140	160	840	3	3	3	4	1	1	3	3	5	50, 60, 80, 100

TABLE 3 SET OF SPACING COLLARS TO SUIT COMPLETE SET D

(*Clauses* 9 *and* A-1)

All dimensions in millimetres.



Arbor Length	Bearing Collar		Length Covered by Spacing Collar	Number of Spacing Collars of Thickness									For Arbor Diameter *d*
l	*D*	*L*		1	2	3	6	10	20	30	60	100	
200	42	60	80	1	1	1	1	2	1	1	—	—	16
	48	70	60	1	1	1	1	1	2	—	—	—	22, 27
250	48	70	110	1	1	1	1	1	3	1	—	—	16, 22, 27
315	48	70	175	2	2	1	3	2	2	3	—	—	16, 22, 27
	56	80	155	1	2	2	1	2	3	2	—	-	16, 22, 27, 32, 40
	70	100	115	1	2	2	1	2	1	2	—	—	32, 40
400	48	70	260	1	3	1	2	4	1	6	—	—	16, 22, 27
	56	80	240	1	1	1	1	4	2	5	—	—	16, 22, 27, 32, 40
	70	100	200	1	1	1	1	4	3	3	—	—	22, 27, 32, 40, 50
500	48	70	360	1	1	1	1	4	2	9	—	—	22, 27
	56	80	340	1	1	1	1	5	2	8	—	—	22, 27, 32, 40
	70	100	300	1	1	1	1	5	3	6	—	—	22, 27, 32, 40, 50
	85	120	260	1	1	1	1	4	3	5	—	—	22, 27, 32, 40, 50

(*Continued*)

TABLE 3 SET OF SPACING COLLARS TO SUIT COMPLETE SET D — *Contd*

Arbor Length *l*	Bearing Collar		Length Covered by Spacing Collar	Number of Spacing Collars of Thickness									For Arbor Diameter *d*
	D	*L*		1	2	3	6	10	20	30	60	100	
630	48	70	490	1	1	1	1	2	2	4	5	—	22
	56	80	470	1	1	1	1	3	2	3	5	—	22, 27, 32, 40
	70	100	430	1	1	1	1	3	3	3	4	—	22, 27, 32, 40, 50
	85	120	390	1	1	1	1	3	4	3	3	—	22, 27, 32, 40, 50
	110	140	350	1	1	1	1	3	2	3	3	—	50, 60
800	56	80	640	2	3	2	3	3	2	4	2	3	27, 32, 40
	70	100	600	2	3	2	3	2	3	3	2	3	27, 32, 40, 50
	85	120	560	2	3	2	3	1	2	2	2	3	27, 32, 40, 50
	110	140	520	2	3	2	3	3	2	2	1	3	50, 60, 70, 100
	140	160	480	2	3	2	3	2	2	1	1	3	100
1 000	56	80	840	2	3	2	3	3	4	4	3	4	32, 40
	70	100	800	2	3	2	3	3	5	4	2	4	32, 40, 50
	85	120	760	2	3	2	3	3	3	4	2	4	32, 40, 50
	110	140	720	2	3	2	3	2	3	3	2	4	50, 60, 80, 100
	140	160	680	2	3	2	3	1	3	2	2	4	100

EXPLANATORY NOTE

This standard was first published in 1977. This revision has been carried out to bring it in line with the current practice followed by the industry. In order to reduce variety of complete set of arbor set A, E and F have been deleted from this specification, also the scope of self-release 7/24 taper has been adopted in this standard replacing morse taper for milling arbors.

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